

# Colloquium

University of Notre Dame  
Department of Mathematics

Junliang Shen - Massachusetts Institute of Technology

**Speaker:** Junliang Shen

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**Will give a lecture entitled**

The  $P=W$  Conjecture and hyperKähler geometry



**Date:** Thursday, January 21, 2021

**Time:** 3:00 PM

**Location:** Zoom

**Zoom URL:** [notredame.zoom.us/j/95373094605?pwd=LzBWVkcwd3RkVjY3UGFoWldSeDFqdz09](https://notredame.zoom.us/j/95373094605?pwd=LzBWVkcwd3RkVjY3UGFoWldSeDFqdz09)

**Abstract:**

Topology of Hitchin's integrable systems and character varieties play important roles in many branches of mathematics. In 2010, de Cataldo, Hausel, and Migliorini discovered a surprising phenomenon which relates these two very different geometric objects in an unexpected way. More precisely, they predict that the topology of Hitchin systems is tightly connected to Hodge theory of character varieties, which is now called the " $P=W$ " conjecture. In this talk, we will discuss recent progress of this conjecture. In particular, we focus on general interactions between topology of Lagrangian fibrations and Hodge theory in hyper-Kähler geometries. This hyper-Kähler viewpoint sheds new light on both the  $P=W$  conjecture for Hitchin systems and the Lagrangian base conjecture for compact hyper-Kähler manifolds.